DOCUMENT RESUME

ED 356 342 CE 063 409

AUTHOR	Davis, Diane, Ed.
TITLE	Criterion-Referenced Test (CRT) Items for Air Conditioning, Heating and Refrigeration.
INSTITUTION	Missouri Univ., Columbia. Instructional Materials Lab.
SPONS AGENCY	Missouri State Dept. of Elementary and Secondary Education, Jefferson City. Div. of Vocational and Adult Education.
PUB DATE	92
NOTE	154p.; Cover title varies slightly.
AVAILABLE FROM	Instructional Materials Laboratory, 8 London Hall, University of Missouri-Columbia, Columbia, MO 65211 (order no. 70-3000-E: $17.05 including IBM disk).
PUB TYPE	Tests/Evaluation Instruments (160) -- Machine-Readable Data Files (MRDF) (102)
EDRS PRICE	MF01 Plus Postage. PC Not Available from EDRS.
DESCRIPTORS	*Air Conditioning; Competency Based Education; *Criterion Referenced Tests; Electricity; *Heating; *Item Banks; Leadership Training; Multiple Choice Tests; Postsecondary Education; Problem Solving; *Refrigeration; Refrigeration Mechanics; Safety; Safety Education; Secondary Education; Student Leadership; Student Organizations; Test Items; Trade and Industrial Education; Troubleshooting
IDENTIFIERS	Missouri

ABSTRACT

These criterion-referenced test (CRT) items for air conditioning, heating, and refrigeration are keyed to the Missouri Air Conditioning, Heating, and Refrigeration Competency Profile. The items are designed to work with both the Vocational Instructional Management System and Vocational Administrative Management System. For word processing and test-item generation purposes, the item bank is available separately on an IBM-compatible disk. A list of references used for air conditioning CRTs appears before the table of contents. Each item in the bank is identified by eight fields: unique item number, duty area and task number (Missouri competency profile), letter of correct answer, source (author, year of publication), date, learning domain (cognitive, affective, psychomotor), writer(s)/reviewer(s), and accompanying artwork. The CRT items are categorized into 12 duties: safety, basic refrigeration, tubing and connections, basic electricity, controls, domestic refrigeration, commercial refrigeration, residential/light commercial cooling/heating, diagnosing and problem solving, fundamentals of air conditioning, customer sales and relations, and leadership. Each duty is further divided into from 1 to 30 tasks. (YLB)

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Criterion-Referenced Test Items for AIR CONDITIONING, HEATING, AND REFRIGERATION

CE 063409

INSTRUCTIONAL MATERIALS LABORATORY
UNIVERSITY OF MISSOURI-COLUMBIA • COLUMBIA, MISSOURI

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Criterion-Referenced Test (CRT) Items for
AIR CONDITIONING, HEATING AND REFRIGERATION

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Catalog No. 70-3000-E
1992

The activity which is the subject of this report was supported in whole or in part by funds from the Department of Elementary and Secondary Education, Division of Vocational and Adult Education. However, the opinions expressed herein do not necessarily reflect the position or policies of the Missouri Department of Elementary and Secondary Education or the Division of Vocational and Adult Education, and no official endorsement should be inferred.

FOREWORD

Rapid advances in technology are placing heavy demands on both teachers and students in vocational education. These Criterion-Referenced Test Items for Air Conditioning, Heating and Refrigeration are designed to help meet those demands.

All test writers face one basic challenge: to produce test items that accurately measure what they are intended to measure. This challenge was kept firmly in mind by all those who participated in the development of the bank. The items in the bank are based upon competencies found on the Missouri Air Conditioning, Heating and Refrigeration Competency Profile. Much care was taken to ensure that the test items will accurately measure a student's knowledge in regard to these competencies. Every effort was made to ensure the items are presented in a fair and unbiased matter.

The items in this book are designed to work with both the Vocational Instructional Management System (VIMS) and VAMS. The test item bank will allow instructors and administrators to manage testing and evaluation activities in the most efficient way possible. Instructors pulling items from this bank for individual tests should still evaluate the new test to see that one question does not give away the answer to another question. Also, instructors should make sure students understand *which area* of Air Conditioning, Heating and Refrigeration is being tested (domestic, commercial, residential, etc.) For word processing and test-item generation purposes, an ASCII disk of the item bank has been included with this printed copy.

This test bank should be viewed as a beginning. It is hoped that future revisions and additions will build the bank into an even more powerful and reliable evaluation and management tool.

Carrie Haner, supervisor
Industrial Education
Department of Elementary and Secondary Education

Charles "Chuck" Waibel, director
Industrial Education
Department of Elementary and Secondary Education

ACKNOWLEDGMENTS

These Criterion-Referenced Test (CRT) Items for Air Conditioning, Heating and Refrigeration represent a continuing commitment to Missouri's Vocational Instructional Management System (VIMS). The bank is keyed to the Air Conditioning, Heating and Refrigeration Competency Profile developed by industry and education professionals in the state. The cycle of curriculum development includes the following steps:

1. Development of the competency profile
2. Instructional analysis
3. Search for existing materials and/or a crosswalk of existing curriculum materials to the competency profile
4. Development of the curriculum guide
5. Field-test of the curriculum guide
6. Development of mediated curriculum (videos)
7. Development of the test-item bank

To ensure that test items are firmly based on information available to students, development of the test-item bank is the final component in the development cycle.

These teachers contributed as writers, advisory committee members and field-testers.

Walter Eudaley, Poplar Bluff Area Vocational Technical School
Neil Greer, Clinton Area Vocational Technical School
Ray Norris, Central Missouri State University
Kennon Shaw, Nevada Area Vocational Technical School
Homer Summers, South County Technical School, St. Louis

These CRTs were technically reviewed by Charles Oviatt, educational consultant, Vienna, Mo.

Support and contributions of IML staff members were instrumental to this project's development.

Harley Schlichting, director
Amon Herd, associate director
Phyllis Miller and Dan Stapleton, assistant directors
Sharon Dyer, graphic designer
Tracy Stock and Kristin Heinbaugh, word processors III
Fred Smith, graduate assistant

REFERENCES USED FOR AIR CONDITIONING CRTs

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Dom.	Wantiez, Gary W. Domestic Refrigeration. Stillwater, OK: Mid-America Vocational Curriculum Consortium, 1983.
Electr.	Wantiez, Gary W. Electrical Components and Systems. Stillwater, OK: Mid-America Vocational Curriculum Consortium, 1984.
Fund.	Wantiez, Gary W. Air Conditioning and Refrigeration Fundamentals. Stillwater, OK: Mid-America Vocational Curriculum Consortium, 1984.
Langley	Langley, Billy C. Control Systems for Air Conditioning and Refrigeration. Englewood Cliffs, NJ: Prentice-Hall, Inc., 1985.
Modern	Althouse, Andrew D.; Carl H. Turnquist; Alfred F. Bracciano. Modern Refrigeration and Air Conditioning. South Holland, IL: The Goodheart-Willcox Company, Inc., 1988 and 1992.
VICA	Goodrick, Bill. Missouri VICA Curriculum Guide. University of Missouri-Columbia: Instructional Materials Laboratory, 1986.

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Field	Contents	Field	Contents
1	Unique item number	5	Date (MMYY)
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4	Source (author, year of publication)	8	Accompanying artwork (ART)

.....

1. | A1 | b | Delmar | 1291 | C | N.G. |

When using a torch, why should a fire extinguisher be close by?

a. In case a burn occurs

b. In case a fire occurs

c. To extinguish the torch when finished

d. To shield against non-combustibles

.....

2. | A1 | b | Fund. | 1291 | C | N.G. |

How is a foam fire extinguisher held when it is used?

a. Upright

b. Upside down

c. Sideways

d. Forty-five degree angle

.....

3. | A1 | a | Fund. | 1291 | C | N.G. |

Sand is an effective material for extinguishing Class D fires.

a. True

b. False

.....
4. | A2 | b | Delmar | 1291 | C | N.G. |

If there is trash or junk parts in a pathway, jump over it to get past.

a. True

b. False

.....
5. | A2 | a | Delmar | 1291 | C | N.G. |

When not in use, acetylene torches should be shut off and stored with the hoses coiled.

a. True

b. False

.....
6. | A2 | b | Delmar | 1291 | C | N.G. |

A vise should be left fully open, ready for the next user.

a. True

b. False

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7. | A3 | b | Delmar | 1291 | C | N.G. |

Horseplay is a tolerated activity in a workshop.

a. True

b. False

.....
8. | A3 | a | Delmar | 1291 | C | N.G. |

A machine and its parts can be replaced, but fingers and eyes are irreplaceable.

a. True

b. False

.....
9. | A3 | b | Delmar | 1291 | C | N.G. |

"Bull" work, such as pushing a refrigerator, is safe and saves time.

a. True

b. False

.....
10. | A4 | b | Delmar | 1291 | C | N.G. |

What can be used to safely remove an electrical wire from a shock victim?

a. Pipe

b. Wood

c. Wire

d. Pliers

.....
11. | A4 | c | Delmar | 1291 | C | N.G. |

What can be used to safely drag an electrical shock victim from a live cable?

a. Wire

b. Pipe

c. Belt

d. Vine

.....
12. | A4 | c | Delmar | 1291 | C | N.G. |

What injury can result from electrical shock?

a. Broken bone

b. Bleeding

c. Death

d. Choking

Field	Contents	Field	Contents
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13. | A5 | b | Delmar | 1291 | C | N.G. |

Before repair, refrigerant should be bled to the atmosphere.

a. True

b. False

.....
14. | A5 | b | Delmar | 1291 | C | N.G. |

Why should the fumes from a halide torch NEVER be inhaled?

a. Frostbite

b. Toxicity

c. Hypnotism

d. Burns

.....
15. | A5 | d | Delmar | 1291 | C | N.G. |

What will be the result if liquid refrigerant is sprayed on the human hand?

a. Warmth

b. Singe

c. Burn

d. Frostbite

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.....
16. | B1 | c | Delmar | 1291 | C | N.G. |

What does "the process of removing heat from a space to be cooled to a location where it is not objectionable" define?

a. Circuit

b. Heating

c. Refrigeration

d. Cycle

.....
17. | B1 | c | Delmar | 1291 | C | N.G. |

Which term expresses "heat intensity"?

a. Celsius

b. Thermometer

c. Temperature

d. Rankine

.....
18. | B1 | b | Delmar | 1291 | C | N.G. |

Which term expresses "heat transfer from one place to another with air"?

a. Conduction

b. Convection

c. Radiation

d. Absolute

.....
19. | B2 | a | Delmar | 1291 | C | N.G. |

Which gauge of the manifold gauge set will read a vacuum?

a. Low side

b. High side

c. Vacuum

d. Micron

.....
20. | B2 | a | Delmar | 1291 | C | N.G. |

Which gauge of the manifold gauge set will read suction pressure?

a. Low side

b. High side

c. Vacuum

d. Micron

.....
21. | B2 | b | Delmar | 1291 | C | N.G. |

Which gauge of the manifold gauge set will read discharge pressure?

a. Low side

b. High side

c. Vacuum

d. Micron

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.....
22. | B3 | c | Delmar | 1291 | C | N.G. |

Which term describes a procedure for finding where refrigerant is escaping from a system?

a. Cold trap

b. Refrigerant recovery

c. Leak detection

d. Deep vacuum

.....
23. | B3 | b | Delmar | 1291 | C | N.G. |

Which equipment is used for removing moisture from a sealed system?

a. Compound gauge

b. Vacuum pump

c. Cold trap

d. Valve depressor

.....
24. | B3 | d | Delmar | 1291 | C | N.G. |

What does "reducing pressure in a refrigeration system below 0 psig so that the moisture is pulled out" define?

a. Recovery

b. Recycling

c. Condensing

d. Evacuation

.....
25. | B4 | c | Delmar | 1291 | C | N.G. |

Which component gives off the heat picked up in the evaporator?

a. Compressor

b. Evaporator

c. Condenser

d. Metering device

.....
26. | B4 | b | Delmar | 1291 | C | N.G. |

Which component absorbs heat from the space to be cooled?

a. Compressor

b. Evaporator

c. Condenser

d. Metering device

.....
27. | B4 | d | Delmar | 1291 | C | N.G. |

Which component regulates the flow of refrigerant to the evaporator?

a. Compressor

b. Evaporator

c. Condenser

d. Metering device

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.....
28. | B5 | a | Modern | 1291 | C | K.S. |

A new filter dryer should be installed in the liquid line whenever it is necessary to break into the system.

a. True

b. False

.....
29. | B5 | d | Modern | 1291 | C | K.S. |

What might the technician do on an outdoor condenser that is required to run at low ambient temperatures?

a. Oversize the compressor.

b. Install an extra filter dryer.

c. Install dual thermostats on the evaporator.

d. Install a fan-cycling switch on the condenser.

.....
30. | B5 | a | Modern | 1291 | C | K.S. |

Low suction pressure will sometimes cause overheating of the compressor.

a. True

b. False

.....
31. | B6 | c | Delmar | 1291 | C | K.S. |

What would the technician first check for high head pressure problems?

a. Ambient temperature too low

b. Low pressure control valve

c. Condenser fan condition

d. Too much draft

.....
32. | B6 | a | Delmar | 1291 | C | K.S. |

What causes non-condensing gases (air) in a refrigeration system?

a. Careless handling of refrigerant

b. Compressor sized wrong

c. Condenser fan running too fast

d. Too much refrigerant

.....
33. | B6 | b | Delmar | 1291 | C | K.S. |

High head pressure increases efficiency of most units.

a. True

b. False

Field	Contents	Field	Contents
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34. | B6 | d | Delmar | 1291 | C | K.S. |

What is one cause of low suction pressure in a refrigerator?

a. Opening the door excessively

b. Too much warm food

c. Frequent defrosting

d. Stopped-up capillary tube

.....

35. | B6 | a | Modern | 1291 | C | K.S. |

What would the technician look for after finding frost on the evaporator of an air conditioner?

a. Low suction pressure

b. High suction pressure

c. High head pressure

d. Low head pressure

.....

36. | B6 | b | Delmar | 1291 | C | K.S. |

A dirty filter has little effect on suction pressure.

a. True

b. False

.....
37. | B7 | c | Modern | 1291 | C | K.S. |

What is ambient temperature?

a. The refrigeration effect upon air temperature

b. Temperature plus humidity of surrounding air and object

c. Air temperature surrounding an object

d. Air temperature affecting the low pressure cut-out

.....
38. | B7 | b | Modern | 1291 | C | K.S. |

Heat and temperature mean the same thing.

a. True

b. False

.....
39. | B7 | d | Modern | 1291 | C | K.S. |

What is the most important item to consider in the use of a thermometer?

a. Super-heat measuring ability

b. Size

c. Substances it will measure

d. Accuracy

Field	Contents	Field	Contents
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.....
40. | C1 | c | Fund. | 1291 | C | W.E. |

How is AC/R (air conditioning/refrigeration) tubing easily identified?

a. Has air conditioning/refrigeration (AC/R) stamped on the tubing

b. Has a thin wall and is easy to bend

c. Has been cleaned inside and has sealed ends

d. Is the only tubing that is color coded

.....
41. | C1 | b | Fund. | 1291 | C | W.E. |

What is the most widely used tubing material in the AC/R trade?

a. Aluminum

b. Copper

c. Steel

d. PVC

.....
42. | C1 | a | Fund. | 1291 | C | W.E. |

Nominal-size tubing should never be used for AC/R lines that carry refrigerant.

a. True

b. False

.....
43. | C2 | d | Fund. | 1291 | C | W.E. |

What can result from over-tightening a compression-type flare tool?

a. Annealing

b. Stretch

c. Offset

d. Wash out

.....
44. | C2 | a | Fund. | 1291 | C | W.E. |

Double flares should be used when flaring steel or aluminum.

a. True

b. False

.....
45. | C2 | a | Fund. | 1291 | C | W.E. |

What can over-tightening of a tubing cutter cause the end of the tubing to do?

a. Bend

b. Stretch

c. Split

d. Wash out

Field	Contents	Field	Contents
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.....
46. | C3 | c | Fund. | 1291 | C | W.E. |

Which lines are constructed from AC/R tubing?

a. Condensation

b. Drain

c. Refrigerant

d. Water

.....
47. | C3 | a | Fund. | 1291 | C | W.E. |

The letters M, L, K and DWV indicate the wall thickness of copper tubing.

a. True

b. False

.....
48. | C3 | b | Fund. | 1291 | C | W.E. |

The main application of nominal-size tubing is air conditioning and refrigeration suction lines, discharge lines and liquid lines.

a. True

b. False

.....
49. | C4 | d | Fund. | 1291 | C | W.E. |

Which is the correct flare nut to use in aluminum tubing connections?

a. Copper

b. Brass

c. Steel

d. Aluminum

.....
50. | C4 | b | Fund. | 1291 | C | W.E. |

Aluminum conducts heat better than other metals.

a. True

b. False

.....
51. | C4 | a | Fund. | 1291 | C | W.E. |

Which terms apply to aluminum tubing?

a. Coiled seamless and thin wall

b. Rigid and soft

c. Flexible and hard

d. Thin wall and thick wall

Field	Contents	Field	Contents
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.....
52. | C5 | d | Fund. | 1291 | C | W.E. |

What is the proper method of connecting flexible plastic pipe and fittings?

a. Sweat

b. Plastic glue

c. PVC cement

d. Clamps

.....
53. | C5 | a | Fund. | 1291 | C | W.E. |

What is the proper method of connecting rigid plastic pipe and fittings?

a. PVC cement

b. Clamps

c. Sweat

d. Plastic glue

.....
54. | C5 | a | Modern | 1291 | C | W.E. |

What type of pipe is recommended for condensate drains?

a. PVC

b. Hose

c. Copper

d. Galvanized

.....
55. | C6 | c | Fund. | 1291 | C | W.E. |

What is the melting range of silver brazing alloys?

a. 500-800F

b. 800-1,100F

c. 1,100-1,500F

d. 1,200-1,700F

.....
56. | C6 | a | Fund. | 1291 | C | W.E. |

What is the purpose of silver solder flux?

a. Prevents oxidation and aids in the flow of the solder

b. Prevents alloys from overheating and cleans the joint

c. Prevents toxic fumes created by melting alloys

d. Cleans the joint and softens it for better bonding

.....
57. | C6 | d | Fund. | 1291 | C | W.E. |

Which flame shows the burning of equal parts of oxygen and acetylene?

a. Oxidizing

b. Medium

c. Carburizing

d. Neutral

Field	Contents	Field	Contents
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.....
58. | C7 | c | Fund. | 1291 | C | W.E. |

Which is NOT a component of the oxyacetylene torch outfit?

a. Oxygen regulator

b. Cutting attachment

c. Single hose

d. Twin hose

.....
59. | C7 | b | Fund. | 1291 | C | W.E. |

What is the first step to extinguish the air-acetylene torch flame?

a. Close regulator valve

b. Close tank valve

c. Close torch handle valve

d. Open regulator valve

.....
60. | C7 | a | Fund. | 1291 | C | W.E. |

Which is NOT a component of the air-acetylene torch outfit?

a. Oxygen tank

b. Regulator

c. Striker

d. Torch handle

.....
61. | C8 | c | Fund. | 1291 | C | W.E. |

Which is the proper way to light a torch?

a. Match

b. Open flame

c. Striker

d. Cigarette lighter

.....
62. | C8 | a | Fund. | 1291 | C | W.E. |

Silver solder containing cadmium creates toxic fumes.

a. True

b. False

.....
63. | C8 | a | Fund. | 1291 | C | W.E. |

Acetylene gas becomes unsafe when the pressure exceeds 15 psi.

a. True

b. False

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.....
64. | D1 | a | Electr. | 1291 | C | W.E. |

Be sure the power is off when checking circuits with an ohmmeter.

a. True

b. False

.....
65. | D1 | b | Electr. | 1291 | C | W.E. |

Discharge capacitors with an insulated screwdriver before testing.

a. True

b. False

.....
66. | D1 | a | Electr. | 1291 | C | W.E. |

Stand on a dry, nonconductive surface when testing live circuits.

a. True

b. False

.....
67. | D1 | a | Electr. | 1291 | C | W.E. |

The ohmmeter may explode if it comes into contact with line voltage.

a. True

b. False

.....

68.	D1	a	Electr.	1291	C	W.E.

Electrical meters are delicate test instruments; they should not be jolted or bumped.

a. True

b. False

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.....
69. | D2 | a | Electr. | 1291 | C | W.E. |

What three components make up a complete electrical circuit?

a. Power source, connecting wiring and a load

b. Voltage, resistance and a load

c. Power source, bimetal switch and a load

d. Power source, SPST switch and a load

.....
70. | D2 | c | Electr. | 1291 | C | W.E. |

Which is NOT a conductor of electricity?

a. Copper

b. Aluminum

c. Wood

d. Iron

.....
71. | D2 | a | Electr. | 1291 | C | W.E. |

Ohm's law establishes a mathematical relationship between voltage, amperage and resistance.

a. True

b. False

.....
72. | D3 | d | Electr. | 1291 | C | W.E. |

Which meter is seldom used to test an electrical circuit?

a. Voltmeter

b. Ohmmeter

c. Ammeter

d. Wattmeter

.....
73. | D3 | d | Electr. | 1291 | C | W.E. |

What meter would be used to check for a grounded circuit?

a. Voltmeter

b. Wattmeter

c. Ammeter

d. Ohmmeter

.....
74. | D3 | c | Electr. | 1291 | C | W.E. |

When is the most accurate meter reading obtained?

a. When the battery is new

b. On the highest possible scale

c. In the center two-thirds of the scale

d. On the lowest possible scale

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.....
75. | D4 | b | Electr. | 1291 | C | W.E. |

What is a legend?

a. Drawing of the components in their approximate locations

b. Descriptive list of the components

c. Drawing which represents a particular component

d. Drawing which uses symbols for circuit components

.....
76. | D4 | c | Electr. | 1291 | C | W.E. |

Which is NOT a load?

a. Incandescent bulb

b. Transformer

c. Capacitor

d. Coil

.....
77. | D4 | b | Electr. | 1291 | C | W.E. |

The term "normally open" means the contact is open while the unit is operating.

a. True

b. False

.....
78. | D5 | a | Delmar | 1291 | C | W.E. |

If proper voltage is available to a load and it doesn't operate, the load is probably defective.

a. True

b. False

.....
79. | D5 | b | Delmar | 1291 | C | W.E. |

If proper voltage is NOT available to the load, the load is probably open.

a. True

b. False

.....
80. | D5 | a | Delmar | 1291 | C | W.E. |

An electrical circuit consists of a power source, path for current flow and a load.

a. True

b. False

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.....
81. | D6 | a | Electr. | 1291 | C | W.E. |

Which is NOT a characteristic of a run capacitor?

a. More than 60 microfarad

b. Stays in the circuit

c. Is oil-filled for cooling

d. Less than 60 microfarad

.....
82. | D6 | b | Electr. | 1291 | C | W.E. |

What does the voltage rating of a capacitor tell the technician?

a. Voltage should not be higher

b. Voltage should not be lower

c. Voltage must be the same

d. Voltage can be +/- 20%

.....
83. | D6 | a | Electr. | 1291 | C | W.E. |

Damage to the start winding may occur if the capacitor is improperly wired and becomes shorted.

a. True

b. False

.....
84. | D7 | a | Electr. | 1291 | C | W.E. |

Which is a National Electrical Code requirement for circuit breakers that are less than 600 volts?

a. Shall be capable of automatic reset

b. Will not have a visible "off" and "on" indication

c. Setting of tripping amperage requires dismantling

d. Shall be classified at not more than 100 amperes

.....
85. | D7 | b | Electr. | 1291 | C | W.E. |

The National Electrical Code does NOT require cartridge fuses of 30 amperes or less to be marked with a voltage rating.

a. True

b. False

.....
86. | D7 | a | Electr. | 1291 | C | W.E. |

The National Electrical Code states that plug fuses shall NOT be used in circuits exceeding 125 volts between conductors.

a. True

b. False

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.....
87. | D8 | b | Electr. | 1291 | C | W.E. |

Electric motor run windings are constructed with smaller wire than start windings.

a. True

b. False

.....
88. | D8 | a | Electr. | 1291 | C | W.E. |

Electric motor supply voltage should be within 10% of data plate voltage.

a. True

b. False

.....
89. | D8 | b | Electr. | 1291 | C | W.E. |

Like poles attract, while unlike poles repel.

a. True

b. False

.....
90. | D9 | a | Electr. | 1291 | C | W.E. |

Which amperage would a motor draw when the rotor is not turning with power applied?

a. Locked rotor amps (LRA)

b. Starting amps (SA)

c. Full load amps (FLA)

d. Amps (A)

.....
91. | D9 | c | Electr. | 1291 | C | W.E. |

When using an ohmmeter for testing, what reading indicates a good capacitor?

a. Needle stays on infinity

b. Needle swings toward zero and stays there

c. Needle swings toward zero and slowly returns to infinity

d. Needle swings toward zero and returns to a definite resistance

.....
92. | D9 | d | Electr. | 1291 | C | W.E. |

When using an ohmmeter to test electric motors, what reading indicates it is OK?

a. Needle swings toward zero and slowly returns to infinity

b. Needle stays on infinity

c. Needle swings to zero and stays

d. Needle swings to a definite resistance and stays

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.....

93. | E1 | d | Modern | 1291 | A | R.N. |

What causes most accidents?

a. Dangerous equipment

b. Old electrical wiring

c. Rough or sharp materials

d. Carelessness

.....

94. | E1 | b | Modern | 1291 | A | R.N. |

The human body is a good insulator of electrical current.

a. True

b. False

.....
95. | E2 | b | Modern | 1291 | C | R.N. |

What is "range" as applied to a control?

a. Difference between cut-out and cut-in settings

b. Difference between maximum and minimum settings

c. Adjustment allowing for voltage overload

d. Variety of applications for a particular control

.....
96. | E2 | a | Modern | 1291 | C | R.N. |

Electronic thermistor controls can be used to accurately measure temperatures that other controls are not able to measure.

a. True

b. False

.....
97. | E2 | d | Modern | 1291 | C | R.N. |

How are pressure-type controls and thermostat-bulb, sensor-type controls similar?

a. The switching device portion is located in the space to be conditioned.

b. Both use refrigerant pressure to operate.

c. Both are time-delayed by a resistor.

d. Both operate by pressure exerted on a diaphragm.

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.....
98. | E3 | b | Modern | 1291 | C | R.N. |

What is the differential adjustment of a control?

a. Difference between minimum and maximum settings

b. Difference between cut-out and cut-in settings

c. Difference allowed for altitude adjustment

d. Difference in calibration for temperature or pressure controls

.....
99. | E3 | a | Modern | 1291 | C | R.N. |

When the differential adjustment of a pressure control is changed, the minimum/maximum range is NOT affected.

a. True

b. False

.....
100. | E3 | c | Modern | 1291 | C | R.N. |

At what temperature range do freezers maintain food?

a. 0F to +15F

b. -15F to +20F

c. -20F to +5F

d. -40F to -20F

.....

101.	E4	b	Modern	1291	C	R.N.

Which is necessary in the replacement of a temperature pressure control?

a. Adjust range of new control to 0.

b. Pump refrigerant to the high side.

c. Shut off condenser fan motor.

d. Adjust differential of new control to 0.

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.....
102. | E5, E7 | c | Modern | 1291 | C | R.N. |

The data on a pressure control states, "Cut-out is cut-in less differential." What control settings would accomplish cut-out at 15?

a. Cut-in = 45, differential = 25

b. Cut-in = 40, differential = 20

c. Cut-in = 35, differential = 20

d. Cut-in = 35, differential = 15

.....
103. | E5, E7 | c | Modern | 1291 | C | R.N. |

An ice bath used to check/adjust a refrigerator temperature control maintains the ice and water at what temperature?

a. 40F

b. 35F

c. 32F

d. 25F

.....
104. | E5, E7 | a | Modern | 1291 | C | R.N. |

A motor cycling control on a capillary tube system must have enough differential to allow what to happen on the off cycle?

a. Equalization of pressure

b. High-side pressure to increase

c. Low-side pressure to decrease

d. Evaporator defrosting

.....

105.	E6	a	Modern	1291	C	R.N.

What is a major advantage of using solid-state controls for motor relays?

a. Universal size applications

b. Color coded

c. Requires less wiring

d. Readily available

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.....
106. | E7, E5 | c | Modern | 1291 | C | R.N. |

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.....
107. | E7, E5 | c | Modern | 1291 | C | R.N. |

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.....
108. | E7, E5 | a | Modern | 1291 | C | R.N. |

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a. Equalization of pressure

b. High-side pressure to increase

c. Low-side pressure to decrease

d. Evaporator defrosting

.....
109. | E8 | a | Modern | 1291 | C | R.N. |

What is the purpose of a timer on a domestic refrigerator?

a. Accomplish defrost

b. Lower energy consumption

c. Protect the compressor

d. Turn on fans

.....
110. | E8 | c | Modern | 1291 | C | R.N. |

Why are some systems pumped down before the defrost starts?

a. To prevent refrigeration from continuing

b. To stop the compressor

c. To prevent refrigerant migration to compressor

d. Because of defrosting difficulty in the evaporator

Field	Contents	Field	Contents
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.....
111. | E9 | d | Modern | 1291 | C | R.N. |

To what part of the system is a water-regulating valve connected?

a. Low side

b. Both sides

c. Compressor crankcase

d. Compressor head

.....
112. | E9 | b | Modern 14 | 1291 | C | R.N. |

A water-regulating valve controls the flow of water to what component?

a. Compressor

b. Condenser

c. Cooling tower

d. Evaporator

.....
113. | E9 | b | Modern 14 | 1291 | C | R.N. |

A water-regulating valve decreases the amount of water when the head pressure increases.

a. True

b. False

.....
114. | E10 | b | Modern 14 | 1291 | C | R.N. |

A solenoid-operated, water-regulating valve is adjusted by using an ice bath.

a. True

b. False

.....
115. | E10 | a | Modern 14 | 1291 | C | R.N. |

Too much water flow due to a defective regulating valve will still allow the refrigeration system to work properly.

a. True

b. False

Field	Contents	Field	Contents
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.....
116. | E11 | d | Modern | 1291 | C | R.N. |

The oil-pressure safety control operates on a differential of which two pressures?

a. High and low sides

b. Inlet and outlet condenser

c. Compressor crankcase and cylinder head

d. Compressor crankcase and oil pump

.....
117. | E11 | b | Modern | 1291 | C | R.N. |

Why must the oil-pressure safety control have a time-delay feature?

a. To make certain it is a lubrication problem

b. To allow the pump to create positive pressure

c. To prevent short cycling of the compressor

d. To allow refrigerant to circulate through the system

.....
118. | E11 | b | Modern | 1291 | C | R.N. |

The oil-pressure safety control has how many connections to the refrigeration system?

a. One

b. Two

c. Three

d. Four

.....
119. | E12 | d | Langley ch. 3-6 | 1291 | C | R.N. |

Which factor is NOT an advantage of a pneumatic control system?

a. Suitable where an explosive hazard exists

b. Normally quite free from operating problems

c. Usually costs less in large installations

d. Room thermostats use of low-voltage sensors

.....
120. | E12 | c | Langley ch. 3-6 | 1291 | C | R.N. |

The normal pressure for pneumatic systems should fall within what operating range?

a. 5-10 psig

b. 10-15 psig

c. 15-25 psig

d. 25-35 psig

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.....

121. | E13 | a | Modern 12-41 | 1291 | C | R.N. |

A motor starter performs the same function as a start relay, except it contains a fuse or breaker for circuit protection.

a. True

b. False

.....

122. | E13 | d | Modern 12-41 | 1291 | C | R.N. |

How is the magnetic coil of a motor starter wired?

a. Series with the motor start winding

b. Series with the motor run winding

c. Series with both motor windings

d. Parallel with both motor windings

.....

123. | E13 | b | Modern 12-41 | 1291 | C | R.N. |

What is the main advantage of using a motor starter?

a. The coil can carry large amounts of current.

b. A motor control can be placed in a lower current circuit.

c. The contacts can be placed in parallel with the motor.

d. The contacts do not need to carry large amounts of current.

.....
124. | E14 | c | Modern | 1291 | C | H.S. |

What is removed by a current relay in a split-phase, induction-run compressor?

a. Run winding

b. Run capacitor

c. Start winding

d. Fan motor

.....
125. | E14 | d | Modern | 1291 | C | H.S. |

Which instrument is best used to test current relays?

a. Ammeter

b. Neon tester

c. Voltmeter

d. Ohmmeter

.....
126. | E14 | a | Modern | 1291 | C | H.S. |

A replacement current relay should be identical to the original.

a. True

b. False

Field	Contents	Field	Contents
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.....
127. | E15 | b | Modern | 1291 | C | H.S. |

What type of motor uses a potential relay?

a. Permanent split capacitor

b. Capacitor-start, capacitor-run

c. Three-phase

d. Shaded-pole

.....
128. | E15 | b | Modern | 1291 | C | H.S. |

What can be removed when a potential relay is used?

a. Run winding

b. Start capacitor

c. Run capacitor

d. Fan motor

.....
129. | E15 | a | Modern | 1291 | C | H.S. |

The coil of a potential relay is tested across terminals 5 and 2.

a. True

b. False

.....
130. | E16 | b | Modern | 1291 | C | H.S. |

When replacing a cooling contactor on a central AC system, it is NOT necessary to disconnect the power.

a. True

b. False

.....
131. | E16 | c | Modern | 1291 | C | H.S. |

Which instrument is best to use when checking the resistance of a coil on a cooling contactor?

a. Ammeter

b. Neon tester

c. Ohmmeter

d. Voltmeter

.....
132. | E16 | a | Modern | 1291 | C | H.S. |

What should the reading be when testing for voltage on a cooling contactor coil?

a. 24 volts

b. 120 volts

c. 177 volts

d. 240 volts

Field	Contents	Field	Contents
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.....
133. | E17 | c | Modern | 1291 | C | H.S. |

What instrument is used to test a transformer?

a. Ammeter

b. Neon tester

c. Ohmmeter

d. Manometer

.....
134. | E17 | a | Modern | 1291 | C | H.S. |

When installing a transformer, it is necessary to disconnect the power supply.

a. True

b. False

.....
135. | E17 | b | Modern | 1291 | C | H.S. |

What is the function of a transformer?

a. Keeps voltage the same

b. Steps up or steps down voltage

c. Makes unit noisy

d. Enhances appearance of equipment

.....
136. | E18 | b | Modern | 1291 | C | H.S. |

Which is a concept of programmable thermostats?

a. Pressure operated

b. Fully programmable

c. Require intense effort to set

d. High voltage category

.....
137. | E18 | d | Modern | 1291 | C | H.S. |

Which does NOT describe a programmable thermostat?

a. Fully programmable

b. Multi-stage and combination control

c. Override control

d. Thermostatic motor control

.....
138. | E18 | a | Modern | 1291 | C | H.S. |

When there is a loss of power, some programmable thermostats use a battery back-up as the power source.

a. True

b. False

Field	Contents	Field	Contents
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.....
139. | E19 | c | Modern | 1291 | C | H.S. |

Which is NOT a component of a four-way reversing valve?

a. Valve stem

b. Valve body

c. Schrader valve

d. Magnetic coil

.....
140. | E19 | a | Modern | 1291 | C | H.S. |

When using a four-way reversing valve, one valve stem controls the direction of refrigerant flow.

a. True

b. False

.....
141. | E19 | b | Modern | 1291 | C | H.S. |

What is an easy method of identifying a four-way reversing valve?

a. Color of valve

b. Number of openings

c. Weight of valve

d. Electrical supply

Field	Contents	Field	Contents
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NOTE: These items evaluate DOMESTIC refrigeration.

.....
142. | F1 | b | Dom. | 1291 | C | H.S. |

Which rule pertains to a particular trade or operation?

a. General safety

b. Specific safety

c. Good attitude

d. OHSA regulation

.....
143. | F1 | a | Dom. | 1291 | A | H.S. |

When repairing a domestic refrigeration unit, the unit should be unplugged or all fuses and circuit breakers should be pulled and locked.

a. True

b. False

.....
144. | F1 | c | Dom. | 1291 | A | H.S. |

Which is best to use to light a torch?

a. Cigarette lighter

b. Match

c. Striker

d. Candle

.....
145. | F2 | b | Dom. | 1291 | C | H.S. |

Which gauge is best to test compressor efficiency?

a. Oxyacetylene

b. Refrigeration

c. Oil pressure

d. Air

.....
146. | F2 | a | Dom. | 1291 | C | H.S. |

A low-temperature compressor is in condition if it can be pumped down rapidly.

a. True

b. False

.....
147. | F2 | c | Dom. | 1291 | C | H.S. |

Which component is checked when compressor efficiency is measured?

a. Rings

b. Connecting rods

c. Valves

d. Crank journals

Field	Contents	Field	Contents
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.....
148. | F3 | b | Dom. | 1291 | C | H.S. |

What should be removed first before a compressor is removed?

a. Lines

b. Refrigerant

c. Compressor

d. Wiring

.....
149. | F3 | a | Dom. | 1291 | C | H.S. |

When replacing the lines on a compressor with a torch, it is necessary to use a heat sink.

a. True

b. False

.....
150. | F3 | d | Dom. | 1291 | C | H.S. |

What method is NOT used for leak testing?

a. Halide torch

b. Soap bubbles

c. Electronics leak detector

d. Compound gauge

.....
151. | F4 | c | Dom. | 1291 | C | H.S. |

On which side are access valves installed on a hermetic condensing unit?

a. Low

b. High

c. Both

d. Neither

.....
152. | F4 | a | Dom. | 1291 | C | H.S. |

When installing a saddle-type access valve, it is necessary to clean the mating surface of the tube.

a. True

b. False

.....
153. | F4 | a | Dom. | 1291 | C | H.S. |

What must be removed when installing a Schrader-type access valve with a torch?

a. Valve core

b. Part of valve stem

c. Threads holding cap

d. Compressor

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.....
154. | F5 | a | Dom. | 1291 | C | H.S. |

When repairing a condenser, it is necessary to have the system vented.

a. True

b. False

.....
155. | F5 | a | Dom. | 1291 | C | H.S. |

Pressures in excess of 160 psi are unsafe for locating a condenser leak.

a. True

b. False

.....
156. | F5 | a | Dom. | 1291 | C | H.S. |

What size should a replacement condenser be?

a. The exact size

b. One size smaller

c. One size larger

d. Does not matter

.....
157. | F6 | d | Dom. | 1291 | C | H.S. |

Which is used for repairing an aluminum evaporator?

a. Silver solder

b. Soft solder 95/5

c. Soft solder 50/50

d. Epoxy cement

.....
158. | F6 | b | Dom. | 1291 | C | H.S. |

What is a good method to determine the type of metal used in an evaporator?

a. By touch

b. Scraping the surface

c. Test with soap solution

d. With a magnet

.....
159. | F6 | a | Dom. | 1291 | C | H.S. |

When scraped, copper is a reddish color and is non-magnetic.

a. True

b. False

Field	Contents	Field	Contents
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.....
160. | F7 | b | Dom. | 1291 | C | H.S. |

How is the size of a capillary tube specified?

a. O.D.

b. I.D.

c. A.M.

d. P.M.

.....
161. | F7 | c | Dom. | 1291 | C | H.S. |

What is the best method for cutting capillary tube?

a. Hacksaw

b. Tube cutter

c. Notching and breaking

d. Bending back and forth

.....
162. | F7 | a | Dom. | 1291 | C | H.S. |

A capillary tube can be repaired by cleaning.

a. True

b. False

.....
163. | F8 | a | Dom. | 1291 | C | H.S. |

On an upright domestic freezer, where is the defrost timer generally located?

a. At bottom in compressor compartment

b. Inside freezer near door opening

c. Right side under a removable plate

d. At the top of the unit

.....
164. | F8 | c | Dom. | 1291 | C | H.S. |

Which instrument is best used when testing the resistance of an electrical defrost heater?

a. Ammeter

b. Neon tester

c. Ohmmeter

d. Voltmeter

.....
165. | F8 | c | Dom. | 1291 | C | H.S. |

Which instrument is best used when testing a defrost solenoid?

a. Ammeter

b. Neon tester

c. Ohmmeter

d. Voltmeter

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.....
166. | F9 | c | Dom. | 1291 | C | H.S. |

Which instrument is best used when testing a temperature control?

a. Ammeter

b. Neon tester

c. Ohmmeter

d. Voltmeter

.....
167. | F9 | a | Dom. | 1291 | C | H.S. |

Before replacing a temperature control, the electrical power should always be disconnected.

a. True

b. False

.....
168. | F9 | b | Dom. | 1291 | C | H.S. |

Heating systems are generally controlled by pressure switches.

a. True

b. False

.....
169. | F10 | a | Dom. | 1291 | C | H.S. |

Which relay is designed primarily for a domestic compressor?

a. Current

b. Potential

c. Solid state

d. Thermal

.....
170. | F10 | a | Dom. | 1291 | C | H.S. |

When replacing a current relay, it is necessary to use the same exact size.

a. True

b. False

.....
171. | F10 | c | Dom. | 1291 | C | H.S. |

Which is the best instrument to test a potential relay?

a. Ammeter

b. Neon tester

c. Ohmmeter

d. Voltmeter

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.....
172. | F11 | c | Dom. | 1291 | C | H.S. |

Why are heaters necessary in frost-free refrigerators?

a. Remove water

b. Remove steam

c. Remove ice

d. Remove air

.....
173. | F11 | c | Dom. | 1291 | C | H.S. |

Which instrument is best used for testing defrost heaters?

a. Ammeter

b. Neon tester

c. Ohmmeter

d. Voltmeter

.....
174. | F11 | a | Dom. | 1291 | C | H.S. |

When replacing a defrost heater, it is necessary to disconnect the power supply.

a. True

b. False

.....
175. | F12 | b | Dom. | 1291 | C | H.S. |

When cleaning a contaminated system, it is NOT important to wear goggles.

a. True

b. False

.....
176. | F12 | a | Dom. | 1291 | C | H.S. |

When removing a compressor from a contaminated system, it is important to avoid touching the oil.

a. True

b. False

.....
177. | F12 | a | Dom. | 1291 | C | H.S. |

When contaminated lines cannot be cleaned, they should be replaced.

a. True

b. False

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.....
178. | F13 | d | Dom. | 1291 | C | H.S. |

What should NOT be used while charging a domestic refrigerator?

a. Refrigeration gauges

b. Access valves

c. Correct refrigerant

d. Vacuum pump

.....
179. | F13 | a | Dom. | 1291 | C | H.S. |

A lack of refrigerant usually indicates a leak.

a. True

b. False

.....
180. | F13 | d | Dom. | 1291 | C | H.S. |

Which would NOT indicate a loss of refrigerant in a domestic refrigerator?

a. Low head pressure

b. Low low-side pressure

c. Frosted evaporator

d. Frosted suction line

.....
181. | F14 | b | Dom. | 1291 | C | H.S. |

What is the benefit of keeping the condenser clean?

a. Will not make a difference

b. For better heat transfer

c. For better defrosting

d. To make more space

.....
182. | F14 | b | Dom. | 1291 | C | H.S. |

When performing preventive maintenance on a refrigerator, it is NOT a good idea to check all components.

a. True

b. False

.....
183. | F14 | d | Dom. | 1291 | C | H.S. |

Which instrument is best used to test fan motor failure?

a. Ammeter

b. Neon tester

c. Voltmeter

d. Ohmmeter

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.....
184. | F15 | a | Dom. | 1291 | C | H.S. |

A ladder diagram identifies the order of operations for each device.

a. True

b. False

.....
185. | F15 | b | Dom. | 1291 | C | H.S. |

The vertical lines of a ladder diagram do NOT identify the power supply.

a. True

b. False

.....
186. | F15 | b | Dom. | 1291 | C | H.S. |

Which lines on a ladder wiring diagram indicate switches and various loads?

a. Neutral

b. Horizontal

c. Vertical

d. Zig zag

.....
187. | F16 | b | Dom. | 1291 | C | H.S. |

Which method is used to control air movement?

a. Filter

b. Damper

c. Vent

d. Switch

.....
188. | F16 | a | Dom. | 1291 | C | H.S. |

A multi-speed fan motor can control the amount of air moved.

a. True

b. False

.....
189. | F16 | a | Dom. | 1291 | C | H.S. |

When air moves faster than 25 ft./min, an uncomfortable draft can be felt.

a. True

b. False

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.....
190. | F17 | b | Dom. | 1291 | C | H.S. |

Which tool is most important to the refrigeration service technician?

a. Flaring block

b. Refrigeration gauge set

c. Tube cutter

d. Swage pin set

.....
191. | F17 | a | Dom. | 1291 | C | H.S. |

Which instrument should be used to measure the current flow of a circuit?

a. Ammeter

b. Neon tester

c. Ohmmeter

d. Voltmeter

.....
192. | F17 | c | Dom. | 1291 | C | H.S. |

What is measured with a compound gauge?

a. High pressure and temperature

b. Low pressure and humidity

c. Both pressure and vacuum

d. Air movement and temperature

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NOTE: These items test COMMERCIAL refrigeration.

.....
193. | G1 | b | Delmar | 1291 | C | N.G. |

Refrigerant suction vapor entering the compressor is at a low pressure and high temperature.

a. True

b. False

.....
194. | G1 | b | Delmar | 1291 | C | N.G. |

Refrigerant suction vapor contains the latent heat of condensation.

a. True

b. False

.....
195. | G1 | b | Delmar | 1291 | C | N.G. |

A reciprocating compressor contains a component part called an eccentric.

a. True

b. False

.....
196. | G2 | b | Delmar | 1291 | C | N.G. |

Super-heat is heat that is absorbed by a refrigerant during vaporization.

a. True

b. False

.....
197. | G2 | a | Delmar | 1291 | C | N.G. |

Refrigerant discharged from the compressor is in which state?

a. Hot vapor

b. Hot liquid

c. Cool vapor

d. Cool liquid

.....
198. | G2 | c | Delmar | 1291 | C | N.G. |

What are tubing cutters used for?

a. Crimp wire

b. Thread pipe

c. Cut refrigerant copper

d. Cut sheet metal

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.....
199. | G3 | c | Delmar | 1291 | C | N.G. |

Where in the refrigerator system is the receiver located?

a. Discharge line

b. Evaporator outlet

c. Condenser outlet

d. Suction line

.....
200. | G3 | a | Delmar | 1291 | C | N.G. |

When replacing a condensing unit, the charge should be bled off first.

a. True

b. False

.....
201. | G3 | d | Delmar | 1291 | C | N.G. |

Which components are in a condensing unit?

a. Compressor, evaporator, condenser

b. Thermostatic expansion valve, evaporator

c. Evaporator, condenser, service valves

d. Compressor, condenser, receiver, filter-drier

.....
202. | G4 | c | Delmar | 1291 | C | N.G. |

Which service gauge manifold line connection resembles a bicycle inner tube valve?

a. Stop valve

b. Front-seat, back-seat valve

c. Schrader valve

d. Relief valve

.....
203. | G4 | d | Delmar | 1291 | C | N.G. |

Why must the valve stem be removed before brazing in a new Schrader valve?

a. The brass will become brittle.

b. The brass will melt.

c. The gauge set will not fit.

d. The seat will melt.

.....
204. | G4 | a | Delmar | 1291 | C | N.G. |

A service valve is used to check refrigerant pressures.

a. True

b. False

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.....
205. | G5 | b | Delmar | 1291 | C | N.G. |

What valve is necessary for a commercial system that has both a freezer and a cooler?

a. Defrost

b. Solenoid

c. Globe

d. Gate

.....
206. | F5 | a | Delmar | 1291 | C | N.G. |

Where is the evaporator pressure regulator (EPR) valve located?

a. Outlet of the freezer evaporator

b. Outlet of the cooler evaporator

c. Inlet of the freezer evaporator

d. Inlet of the cooler evaporator

.....
207. | G5 | b | Delmar | 1291 | C | N.G. |

In which line is the crankcase pressure regulator (CPR) valve installed?

a. Discharge

b. Suction

c. Liquid

d. Hot gas

.....
208. | G6 | a | Delmar | 1291 | C | N.G. |

How is a tube-within-a-tube condenser cooled?

a. Water

b. Air

c. Evaporation

d. Oil

.....
209. | G6 | b | Delmar | 1291 | C | N.G. |

The condenser absorbs the heat from the space to be cooled.

a. True

b. False

.....
210. | G6 | b | Delmar | 1291 | C | N.G. |

Generally, how is a tube-within-a-tube condenser cleaned?

a. Rod and brush

b. Cleaning solution

c. Air hose

d. Water hose

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.....
211. | G7 | a | Delmar | 1291 | C | N.G. |

A refrigeration reversible ratchet wrench can be used to open and close refrigerant valves.

a. True

b. False

.....
212. | G7 | a | Delmar | 1291 | C | N.G. |

Nuts over tubing flares can be loosened or tightened with a flare nut wrench.

a. True

b. False

.....
213. | G7 | b | Delmar | 1291 | C | N.G. |

Refrigeration copper tubing is cut with a hacksaw.

a. True

b. False

.....
214. | G8 | c | Delmar | 1291 | C | N.G. |

Where is the sensing bulb of a thermostatic expansion valve (TEV) mounted?

a. Compressor suction

b. Condenser outlet

c. Evaporator outlet

d. Compressor discharge

.....
215. | G8 | b | Delmar | 1291 | C | N.G. |

An external equalizer tube is necessary for the thermostatic expansion valve (TEV) when the pressure drop across an evaporator is less than 5 psig.

a. True

b. False

.....
216. | G8 | c | Delmar | 1291 | C | N.G. |

Which control valve regulates the flow of refrigerant into the evaporator?

a. Solenoid

b. Evaporator pressure regulator

c. Thermostatic expansion

d. Suction pressure regulator

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.....
217. | G9 | d | Delmar | 1291 | C | N.G. |

What causes the thermostatic expansion valve (TEV) to increase or decrease the refrigerant flow?

a. Liquid

b. Latent heat

c. Subcooling

d. Super-heat

.....
218. | G9 | b | Delmar | 1291 | C | N.G. |

Which metering device regulates refrigerant flow from the pressure in the evaporator?

a. Thermostatic expansion valve

b. Automatic expansion valve

c. Electronic expansion valve

d. Capillary tube

.....
219. | G9 | b | Delmar | 1291 | C | N.G. |

Latent heat is the heat absorbed after the refrigerant has boiled.

a. True

b. False

.....
220. | G10 | a | Delmar | 1291 | C | N.G. |

Hot gas defrosting utilizes the hot vapor from the compressor discharge line.

a. True

b. False

.....
221. | G10 | d | Delmar | 1291 | C | N.G. |

What is the first step in replacing a defrost timer?

a. Remove the evaporator

b. Remove the timer heater

c. Turn off the compressor

d. Turn off the power

.....
222. | G10 | b | Delmar | 1291 | C | N.G. |

The purpose of a defrost cycle is to melt ice off the suction line.

a. True

b. False

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.....
223. | G11 | b | Delmar | 1291 | C | N.G. |

What instrument is used to test a defective defrost heater?

a. Voltmeter

b. Ohmmeter

c. Ammeter

d. Milliammeter

.....
224. | G11 | b | Delmar | 1291 | C | N.G. |

What controls the defrost heater's on-time?

a. Food in the freezer

b. Settings on the defrost timer

c. Manual switches

d. Low pressure control

.....
225. | G11 | a | Delmar | 1291 | C | N.G. |

In commercial refrigration, what does the mullion heater control?

a. Sweating and freezing around doors

b. Sweating and freezing around the compressor

c. Sweating and freezing of foods

d. Sweating and freezing of the evaporator

.....
226. | G12 | a | Delmar | 1291 | C | N.G. |

Which component must be installed after clean-up of a contaminated system?

a. Suction line filter-drier

b. Liquid line sight glass

c. Condenser-receiver

d. Expansion valve

.....
227. | G12 | d | Delmar | 1291 | C | N.G. |

Which refrigerant is used for clean-up after a compressor burn-out?

a. R-11

b. R-22

c. R-502

d. Refrigerant on data tag

.....
228. | G12 | a | Delmar | 1291 | C | N.G. |

Schrader valves are commonly used for service gauge hook-up.

a. True

b. False

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.....
229. | G13 | a | Delmar | 1291 | C | N.G. |

What does "charging a refrigeration system" mean?

a. Adding refrigerant

b. Bleeding refrigerant

c. Vacuuming refrigerant

d. Cleaning refrigerant

.....
230. | G13 | c | Delmar | 1291 | C | N.G. |

Which charging method is fastest?

a. Vapor

b. Vacuum

c. Liquid

d. Sweep

.....
231. | G13 | b | Delmar | 1291 | C | N.G. |

Vapor charging a refrigeration system requires the charging drum to be in which position?

a. Upside down

b. Right side up

c. Horizontal

d. Forty-five degree

.....
232. | G14 | b | Delmar | 1291 | C | N.G. |

What box temperature range is normal for high-temperature commercial refrigeration?

a. 35-45 degrees F

b. 45-60 degrees F

c. 65-75 degrees F

d. 80-95 degrees F

.....
233. | G14 | a | Delmar | 1291 | C | N.G. |

A head pressure control is needed for winter operating units with outdoor condensers.

a. True

b. False

.....
234. | G14 | a | Delmar | 1291 | C | N.G. |

For a heat transfer to take place, there must be a temperature difference between the space or objects to be cooled and the cooling coil.

a. True

b. False

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235. | G15 | b | Delmar | 1291 | C | N.G. |

Why is a refrigeration gauge manifold set used to test compressor efficiency?

a. Bleed refrigerant

b. Observe operating pressures

c. Evacuate the system

d. Charge the system

.....
236. | G15 | c | Delmar | 1291 | C | N.G. |

What does a vacuum pump remove from the system?

a. Carbon dioxide

b. Nitrogen

c. Moisture

d. Dirt

.....
237. | G15 | d | Delmar | 1291 | C | N.G. |

Why would a refrigeration charging cylinder be used to charge the system?

a. Sweep metal chippings

b. Remove non-condensing gases

c. Purge dust from a component

d. Save charging time

.....
238. | G16 | d | Delmar | 1291 | C | N.G. |

Which kind of manometer can be used to measure vacuum?

a. Draft pressure

b. Inclined

c. Gas pressure

d. Mercury U-tube

.....
239. | G16 | b | Delmar | 1291 | C | N.G. |

At normal atmospheric conditions, air condenses readily.

a. True

b. False

.....
240. | G16 | d | Delmar | 1291 | C | N.G. |

Which will read the vacuum most accurately?

a. U-tube manometer

b. Manifold gauge set

c. Inclined manometer

d. Micron gauge

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241. | G17 | d | Delmar | 1291 | C | N.G. |

Which is a sign of a commercial system overcharge?

a. Cool liquid line

b. Warm suction line

c. Dry suction line

d. Sweating compressor

.....
242. | G17 | b | Delmar | 1291 | C | N.G. |

What do higher-than-normal suction and discharge pressures indicate?

a. Undercharge

b. Overcharge

c. Restriction

d. Burn out

.....
243. | G17 | d | Delmar | 1291 | C | N.G. |

Which condition is indicated by a lower-than-normal suction pressure and a higher-than-normal head pressure?

a. Burn out

b. Undercharge

c. Overcharge

d. Restriction

.....
244. | G18 | b | Delmar | 1291 | C | N.G. |

Start capacitors are wired in parallel to compressor motor start windings.

a. True

b. False

.....
245. | G18 | b | Delmar | 1291 | C | N.G. |

Which relay will remove the start capacitor from the circuit?

a. Fan

b. Potential

c. Centrifugal

d. Inductive

.....
246. | G18 | b | Delmar | 1291 | C | N.G. |

Three-phase motors require potential relays for start-up.

a. True

b. False

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NOTE: These items cover RESIDENTIAL/LIGHT COMMERCIAL cooling/-heating.

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247. | H1 | b | Modern | 1291 | A | K.S. |

The larger the refrigeration equipment, the safer it is to service.

a. True

b. False

.....
248. | H1 | d | Modern | 1291 | C | K.S. |

Why is high pressure cut-out used on water-cooled units?

a. Cycle the unit

b. Stop freeze up

c. Keep unit from short cycling

d. Lessen compressor damage

.....
249. | H1 | a | Modern | 1291 | C | K.S. |

A technician must be certain that the inside pressures are atmospheric before opening any part of the refrigeration system.

a. True

b. False

.....
250. | H2 | b | Delmar | 1291 | C | K.S. |

A compressor can pump only liquid refrigerant.

a. True

b. False

.....
251. | H2 | a | Delmar | 1291 | C | K.S. |

What will a dirty evaporator cause?

a. Low suction pressure

b. Refrigerant leak

c. High head pressure

d. Higher efficiency

.....
252. | H2 | a | Modern | 1291 | C | K.S. |

What is the first task a technician performs in efficiency testing a compressor?

a. Install manifold gauges

b. Test barometric pressure

c. Check outdoor temperature

d. Check fan speed

Field	Contents
1	Unique item number
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7	Writer(s)/reviewer(s)
8	Accompanying artwork (ART)

.....
253. | H3 | b | Modern | 1291 | C | K.S. |

A replacement compressor needs only to have the same bolt pattern and the same line size to be satisfactory.

a. True

b. False

.....
254. | H3 | a | Modern | 1291 | C | K.S. |

Refrigerant should NOT be used to purge a system.

a. True

b. False

.....
255. | H3 | a | Modern | 1291 | C | K.S. |

Why is it important to evacuate a system with a vacuum pump after a compressor change out?

a. Remove air and moisture

b. Remove oil

c. Clean excess solder from the lines

d. Clean the filters

.....
256. | H4 | b | Modern | 1291 | C | K.S. |

A condensing unit should be firmly bolted down to avoid vibration.

a. True

b. False

.....
257. | H4 | b | Delmar | 1291 | C | K.S. |

What will improper air circulation around a condensing unit cause?

a. High suction pressure

b. High head pressure

c. Low head pressure

d. Low suction pressure

.....
258. | H4 | d | Delmar | 1291 | A | K.S. |

Who should be consulted when locating a condensing unit, besides the technician and the sales people?

a. Manufacturer

b. Public utility

c. OSHA code representative

d. Owner

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.....
259. | H5 | a | Modern | 1291 | C | K.S. |

When removing or repairing a condenser, all refrigerant must be extracted.

a. True

b. False

.....
260. | H5 | a | Delmar | 1291 | C | K.S. |

What part does the condenser play in the cooling system?

a. Rejects the heat

b. Absorbs the heat

c. Cools the area

d. Cycles the unit

.....
261. | H5 | d | Modern | 1291 | C | K.S. |

What will excessive oil in the condenser cause?

a. Low head pressure

b. High suction pressure

c. Low suction pressure

d. High head pressure

.....
262. | H5 | b | Modern | 1291 | A | K.S. |

A condenser should be charged before removing it from the cooling system.

a. True

b. False

Field	Contents
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7	Writer(s)/reviewer(s)
8	Accompanying artwork (ART)

.....
263. | H6 | a | Modern | 1291 | C | K.S. |

The purpose of the evaporator is to transfer heat from the substance circulating over the evaporator to the refrigerant.

a. True

b. False

.....
264. | H6 | a | Modern | 1291 | C | K.S. |

One of the laws of thermodynamics (heat in action) is that heat always flows from a warm object to a cool object.

a. True

b. False

.....
265. | H6 | a | Modern | 1291 | C | K.S. |

What is the best method for repairing a defective aluminum evaporator?

a. Replacement

b. Soft solder

c. Swedging

d. Epoxy

.....
266. | H6 | b | Modern | 1291 | C | K.S. |

An evaporator is used only in larger commercial units.

a. True

b. False

Field	Contents
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.....
267. | H7 | b | Delmar | 1291 | C | K.S. |

What operates the water valve on a water-cooled condenser?

a. Thermostat

b. Head pressure

c. Super-heat

d. Suction pressure

.....
268. | H7 | d | Modern | 1291 | C | K.S. |

What component does the pressure-regulating valve protect?

a. Evaporator

b. Condenser

c. Low-side float

d. Compressor

.....
269. | H7 | c | Modern | 1291 | C | K.S. |

What is the purpose of the service valve?

a. Control head pressure

b. Control suction pressure

c. Install manifold gauges

d. Return oil to the compressor

.....
270. | H8 | d | Modern | 1291 | C | K.S. |

What is the purpose of the expansion valve?

a. Maintain the proper oil flow back to the compressor

b. Allow the compressor to start with low pressure

c. Cycle the unit at the proper temperature

d. Maintain proper amount of refrigerant in the evaporator

.....
271. | H8 | a | Modern | 1291 | C | K.S. |

A clogged screen can be easily detected by poor refrigeration, sweating, or frosting near the TEV only and no refrigerant sound.

a. True

b. False

.....
272. | H8 | a | Modern | 1291 | C | K.S. |

What is a necessary concept in servicing expansion valves?

a. Super-heat

b. Oil pressure

c. Direct expansion

d. Operation of check valves

Field	Contents
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.....
273. | H9 | d | Modern | 1291 | C | K.S. |

What must the technician do in the case of a small leak in a TEV power element?

a. Adjust

b. Recharge

c. Repair

d. Replace

.....
274. | H9 | b | Modern | 1291 | C | K.S. |

What is the purpose of an adjustable expansion valve?

a. Stop short cycling

b. Set super-heat

c. Set compressor run time

d. Adjust low-side pressure

.....
275. | H9 | a | Modern | 1291 | C | K.S. |

Most service technicians adjust the thermostatic expansion valve to the minimum stable signal point.

a. True

b. False

.....
276. | H9 | b | Modern | 1291 | C | K.S. |

Where should the bulb from a thermostatic expansion valve (TEV) be located?

a. High-pressure line leaving the compressor

b. Suction line leaving the evaporator

c. Low-side line entering the compressor

d. High-side line entering the evaporator

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.....
277. | H10 | b | Modern | 1291 | C | K.S. |

Clean-up after motor burnout can be accomplished with a vacuum pump.

a. True

b. False

.....
278. | H10 | b | Modern | 1291 | C | K.S. |

What is checked with an acid test kit?

a. Refrigerant level

b. Contamination level

c. Stability of the head pressure

d. Suction pressure ability

.....
279. | H10 | a | Delmar | 1291 | C | K.S. |

What is the first indication of a compressor burnout?

a. Refrigerant odor

b. Rise in suction pressure

c. High amperage pull on compressor

d. High head pressure

.....

280.	H10	d	Modern	1291	C	K.S.

What should the technician do to check for a contaminated system?

a. Add oil

b. Blow the charge

c. Remove wiring

d. Test oil

Field	Contents
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.....

281. | H11 | a | Modern | 1291 | A | K.S. |

What is the first step the service technician must take in charging an air conditioner?

a. Install manifold gauges

b. Check barometric pressure

c. Adjust super-heat

d. Check and adjust low-side pressure

.....

282. | H11 | b | Modern | 1291 | C | K.S. |

The charging cylinder should be inverted when charging an air conditioner.

a. True

b. False

.....
283. | H12 | b | Delmar | 1291 | C | K.S. |

It is NOT important to check the ampere load of the compressor when checking cooling capacity.

a. True

b. False

.....
284. | H12 | a | Delmar | 1291 | C | K.S. |

What should the technician be familiar with when checking for capacity of a cooling system?

a. Name plate

b. Manifold gauges

c. Low-side pressure switch

d. High-side pressure switch

.....
285. | H12 | d | Delmar | 1291 | C | K.S. |

What does a low charge on an air conditioner affect?

a. Fan speed

b. Compressor shut-down time

c. High head pressure switch

d. Efficiency of the system

Field	Contents	Field	Contents
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.....
286. | H13 | b | Delmar | 1291 | C | K.S. |

All wiring diagrams use a standard color code.

a. True

b. False

.....
287. | H13 | a | Delmar | 1291 | C | K.S. |

The technician can determine the type of motor from accurately interpreting a wiring diagram.

a. True

b. False

.....
288. | H13 | a | Delmar | 1291 | C | K.S. |

What is the advantage of including both a ladder type and a pictorial wiring diagram for large units?

a. Easier to read and locate

b. More possible colors of wires

c. Can be contained on one page

d. Uses three phase and single phase on one unit

.....
289. | H14 | a | Modern | 1291 | C | K.S. |

Heat pump theory rests on the principle that heat will move from a higher temperature to a lower temperature.

a. True

b. False

.....
290. | H14 | a | Modern | 1291 | C | K.S. |

What heat pump valve is NOT used in an air conditioner?

a. Reversing valve

b. High-pressure valve

c. Low-pressure valve

d. Thermostatic expansion valve

.....
291. | H14 | d | Delmar | 1291 | C | K.S. |

What is the minimum outdoor temperature at which a heat pump is considered an efficient method of heating a home?

a. 60F

b. 40F

c. 32F

d. 0F

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.....
292. | H15 | b | Electr., 585 | 1291 | C | K.S. | ART

In Figure H15, the voltage applied to the heat pump logic module is higher than the voltage applied to the reversing valve.

a. True

b. False

.....
293. | H15 | a | Electr., 585 | 1291 | C | K.S. | ART

In Figure H15, what voltage is applied to the primary side of the transformer?

a. 240

b. 208

c. 110

d. 24

.....
294. | H15 | d | Electr., 585 | 1291 | C | K.S. | ART

In Figure H15, what voltage is carried by the thermostat?

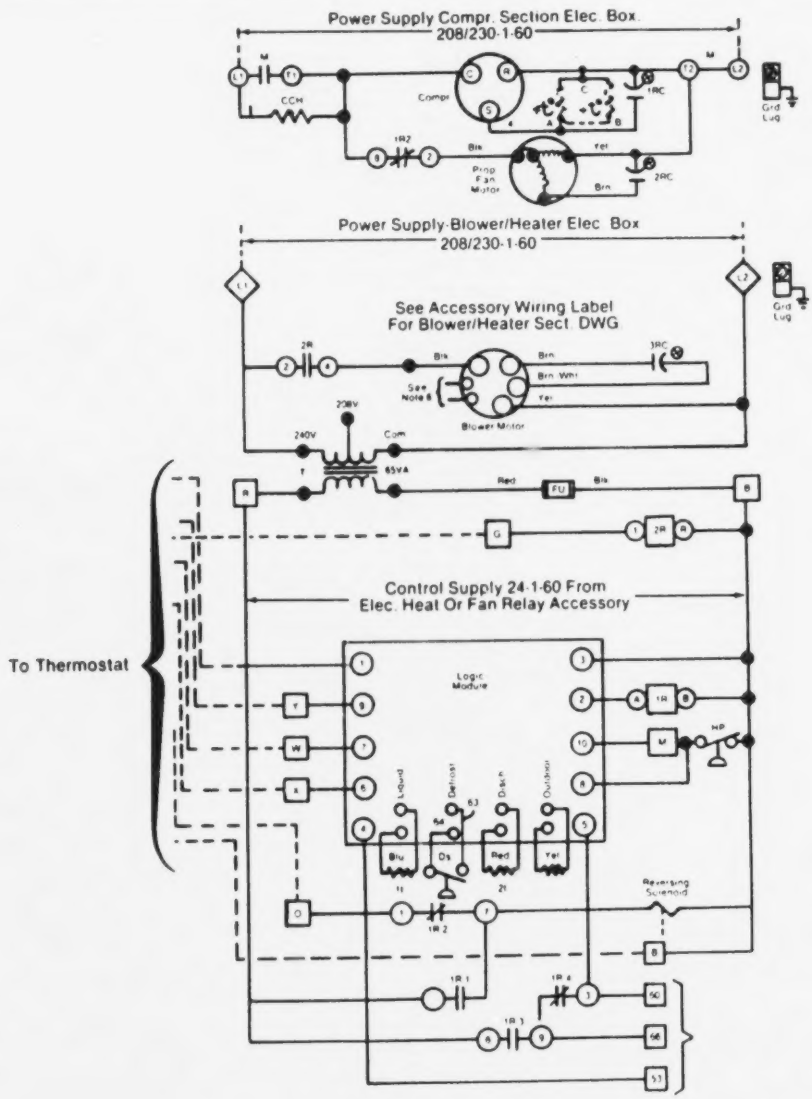
a. 240

b. 208

c. 110

d. 24

Figure H15



LEGEND

1RC	Capacitor, Run, Compressor	2t	Sensor, Discharge	□	Terminal Block, 2TB, With Elec. Heat Or Fan Relay Accessory
2RC	Capacitor, Run, Prop. Fan Motor	3t	Sensor, Ambient		
3RC	Capacitor, Run Blower Motor	DS	Switch, Defrost	△	Terminal, Room Thermostat
HP	Control, High Pressure Open 400 PSIG. Close 300 PSIG	CCH	Heater, Crankcase	——	Wiring & Devices By MFR
		•t°	Start Device	----	Field Wiring By Others
1R	Relay, Defrost	M	Contactor	◇	Connection, Blower/Heater Power Supply
2R	Relay, Fan (Blower)	TC	Thermostat, Cooling	——	Optional Wiring
FU	Fuse 3.2 Amps	TH	Thermostat, Heating		
1t	Sensor, Liquid	●	Identified Term. On Run Cap		

Credit: Air Conditioning and Refrigeration Electrical Components and Systems. Stillwater, OK: Mid-America Vocational Curriculum Consortium, 1983, pg. 585.

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.....
295. | H16 | a | Delmar | 1291 | C | K.S. |

What does the EER (emergency efficiency ratio) reading pertain to?

a. Amount of electricity used per BTU of heat transfer

b. Amount of cooling required on a 90 F day

c. Amount of heating required on a 0 F day

d. Amount of energy required to change from heating to cooling

.....
296. | H16 | d | Delmar | 1291 | C | K.S. |

What is the first check used by the technician to find the capacity of a heat pump?

a. Indoor and outdoor temperatures

b. Dry bulb/wet bulb temperatures

c. High and low pressure readings

d. Name plate data

.....
297. | H16 | b | Modern | 1291 | C | K.S. |

Because of increased electrical costs, the use of heat pumps is decreasing.

a. True

b. False

.....
298. | H17 | b | Delmar | 1291 | C | K.S. |

The defrost cycle is used to remove ice from the indoor coil in the winter.

a. True

b. False

.....
299. | H17 | b | Delmar | 1291 | C | K.S. |

What might the technician look for in locating a defrost control problem in a heat pump?

a. Hot compressor

b. Ice on outdoor unit

c. Build-up of frost on compressor

d. Condenser drain stopped up

.....
300. | H17 | d | Delmar | 1291 | C | K.S. |

In extreme cold weather, what must be working properly before replacing a faulty defrost control?

a. Super-heat

b. Condenser fan

c. Compressor

d. Auxiliary heat

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.....
301. | H18 | c | Delmar | 1291 | C | N.G. |

Which item is common to the home heating and cooling system?

a. Flue pipe

b. Condensing unit

c. Air handler

d. Heat exchanger

.....
302. | H18 | a | Delmar | 1291 | C | N.G. |

What components are contained in the condensing unit?

a. Condenser, compressor, fan motor

b. Evaporator, compressor, fan motor

c. Diverter, compressor, fan motor

d. Separator, compressor, fan motor

.....
303. | H18 | a | Delmar | 1291 | C | N.G. |

What two forms of problems might be involved while checking a residential heating and cooling system?

a. Electrical and mechanical

b. Equipment and ducting

c. Off cycle and on cycle

d. Operating and non-operating

.....
304. | H19 | c | Delmar | 1291 | C | N.G. |

What is a heat pump balance-point work sheet used for?

a. To plot the house heat loss

b. To plot the house heat gain

c. To determine temperature setting for outdoor thermostat

d. To determine temperature setting for indoor thermostat

.....
305. | H19 | b | Delmar | 1291 | C | N.G. |

What is the balance point of a heat pump?

a. Point where back-up heaters cannot generate enough heat

b. Point where the compressor cannot generate enough heat

c. Setting on the compressor contactor points

d. Setting on the compressor overload points

.....
306. | H19 | a | Delmar | 1291 | C | N.G. |

Different balance-point charts are required for each size of heat pump system.

a. True

b. False

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.....
307. | H20 | b | Delmar | 1291 | C | N.G. |

How are low-voltage controls energized in a heating system?

a. 10-volt transformer

b. 24-volt transformer

c. Electronic solenoid

d. Electronic condenser

.....
308. | H20 | d | Delmar | 1291 | C | N.G. |

Which system might use resistance heaters other than a heat pump?

a. Gas furnace

b. Wood furnace

c. Oil furnace

d. Electric furnace

.....
309. | H20 | c | Delmar | 1291 | C | N.G. |

Which heating system requires a pressure-relief valve?

a. Gas

b. Oil

c. Hydronic

d. Electric

.....
310. | H21 | d | Delmar | 1291 | C | N.G. |

Which device controls the heating system's on/off cycle?

a. Transformer

b. Limiter

c. Contactor

d. Thermostat

.....
311. | H21 | b | Delmar | 1291 | C | N.G. |

What is usually the maximum current rating for a line-voltage thermostat?

a. 10 amps

b. 20 amps

c. 50 amps

d. 120 amps

.....
312. | H21 | a | Delmar | 1291 | C | N.G. |

Which device prematurely starts a furnace?

a. Heat anticipator

b. Cold anticipator

c. Bi-metal limiter

d. Resistor limiter

Field	Contents	Field	Contents
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.....
313. | H22 | c | Delmar | 1291 | C | N.G. |

When should a furnace be cleaned and test operated?

a. Spring

b. Summer

c. Fall

d. Winter

.....
314. | H22 | c | Delmar | 1291 | C | N.G. |

What two forms of furnace malfunctions might be encountered during start-up?

a. Equipment and mechanical

b. Electrical and wiring

c. Electrical and mechanical

d. Wiring and sizing

.....
315. | H22 | a | Delmar | 1291 | C | N.G. |

Which gas furnace control shuts down the burners when there is too little air flow through the heat exchanger?

a. Limit switch

b. Fan

c. Thermocouple

d. Thermopile

.....
316. | H23 | a | Delmar | 1291 | C | N.G. |

The motor blower assembly of a heating and cooling system should have variable speed capability.

a. True

b. False

.....
317. | H23 | d | Delmar | 1291 | C | N.G. |

How many cubic feet per minute of air are required for each 12,000 BTUs of cooling?

a. 30

b. 40

c. 300

d. 400

.....
318. | H23 | c | Delmar | 1291 | C | N.G. |

What damage can occur to a compressor when there is too little air flow through the evaporator?

a. Heating

b. Wiring

c. Slugging

d. Sizing

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.....
319. | H24 | d | Delmar | 1291 | C | N.G. |

What is the first step in replacing an electric motor?

a. Remove the blower

b. Remove the motor

c. Turn on power

d. Turn off power

.....
320. | H24 | b | Delmar | 1291 | C | N.G. |

What size motor should replace a faulty one?

a. Smaller size

b. Same size

c. 10% larger

d. 10% smaller

.....
321. | H24 | d | Delmar | 1291 | C | N.G. |

Why are the wires of a blower motor different colors?

a. To identify the armature

b. To identify the manufacturer

c. For speed experimentation

d. For proper speed selection

.....
322. | H25 | a | Delmar | 1291 | C | N.G. |

What charges air particles as they pass through an electronic air cleaner?

a. Ionizing section

b. Treated section

c. Charcoal cleaner

d. Collector cleaner

.....
323. | H25 | b | Delmar | 1291 | C | N.G. |

Adjacent plates in the collecting section of an electronic air cleaner have the same charge.

a. True

b. False

.....
324. | H25 | a | Delmar | 1291 | C | N.G. |

What circuit of an electronic air cleaner does the power supply contain?

a. Voltage doubler

b. Voltage divider

c. Voltage tripler

d. Voltage multiplier

Field	Contents	Field	Contents
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.....
325. | H26 | b | Delmar | 1291 | C | N.G. |

How often should heating and cooling system air filters be changed or cleaned?

a. Every two weeks

b. Monthly

c. Every two months

d. Yearly

.....
326. | H26 | d | Delmar | 1291 | C | N.G. |

How often should a furnace have a complete cleaning and operation tests performed?

a. Every two weeks

b. Monthly

c. Every two months

d. Yearly

.....
327. | H26 | b | Delmar | 1291 | C | N.G. |

Sealed bearings on blower motors need oiling monthly.

a. True

b. False

.....
328. | H27 | b | Delmar | 1291 | C | N.G. |

When pumping down a refrigerant system, leave the receiver outlet valve fully open.

a. True

b. False

.....
329. | H27 | a | Delmar | 1291 | C | N.G. |

When pumping down a refrigerant system, allow the low-pressure switch to cycle off at 10 psi.

a. True

b. False

.....
330. | H27 | c | Delmar | 1291 | C | N.G. |

What is a good reason to pump down a system before repairing a leak?

a. Test the low-pressure cut-out switch.

b. Test the high-pressure cut-out switch.

c. Save refrigerant.

d. Save oil.

Field	Contents	Field	Contents
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331. | H28 | b | Delmar | 1291 | C | N.G. |

A drier should be replaced every month.

a. True

b. False

.....
332. | H28 | a | Delmar | 1291 | C | N.G. |

When replacing a drier, the seals should be left on the new one until the moment of installation.

a. True

b. False

.....
333. | H28 | c | Delmar | 1291 | C | N.G. |

After installing a new drier, what task should be performed?

a. Clean the compressor

b. Take a break

c. Test for leaks

d. Charge the system

.....
334. | H29 | b | Delmar | 1291 | C | N.G. |

Air is injected into the water of a cooling tower to remove heat.

a. True

b. False

.....
335. | H29 | a | Delmar | 1291 | C | N.G. |

What is a necessary maintenance task for winter operation of a natural-draft cooling tower?

b. Blower belt tightening

a. Freeze protection

c. Nozzles rotated 90 degrees

d. Evaporation protection

.....
336. | H29 | a | Delmar | 1291 | C | N.G. |

Evaporative cooling towers have the condenser located outside the tower.

a. True

b. False

Field	Contents	Field	Contents
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.....

337. | H30 | b | Delmar | 1291 | C | N.G. |

What equipment should the technician have to check system refrigerant pressures?

a. Voltmeter

b. Manifold gauge set

c. Capacitor analyzer

d. Acetylene torch outfit

.....

338. | H30 | c | Delmar | 1291 | C | N.G. |

What instrument should the AC technician have to check current flow?

a. Voltmeter

b. Ohmmeter

c. Ammeter

d. Megameter

.....

339. | H30 | c | Delmar | 1291 | C | N.G. |

What tool is used to operate front-seat back-seat service valves?

a. Monkey wrench

b. Pipe wrench

c. Refrigeration rachet wrench

d. Socket rachet wrench

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.....
340. | I1 | b | Delmar | 1291 | C | N.G. |

Which causes obstructed airflow in an air conditioning duct system?

a. Dirty cover

b. Dirty filter

c. Static pressure

d. Static electricity

.....
341. | I1 | b | Delmar | 1291 | C | N.G. |

An air duct system draws air into the conditioning equipment for heat storage.

a. True

b. False

.....
342. | I1 | a | Delmar | 1291 | C | N.G. |

The furnace blower uses electrical energy to move air.

a. True

b. False

.....
343. | I2 | b | Delmar | 1291 | C | N.G. |

What is the first step in diagnosing an electrical problem?

a. Check compressor

b. Check voltage

c. Check amperage

d. Check capacitor

.....
344. | I2 | a | Delmar | 1291 | C | N.G. |

What is the first step in replacing a compressor contactor?

a. Turn off power

b. Turn off compressor

c. Remove contactor

d. Remove capacitor

.....
345. | I2 | d | Delmar | 1291 | C | N.G. |

What are two types of electrical blower motors?

a. Horizontal drive and vertical drive

b. Slip drive and non-slip drive

c. Internal drive and external drive

d. Belt drive and direct drive

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.....
346. | I3 | b | Delmar | 1291 | C | N.G. |

Which instrument is used to measure natural gas pressure?

a. U-tube mercury manometer

b. U-tube water manometer

c. Inclined water manometer

d. Electronic vacuum gauge

.....
347. | I3 | b | Delmar | 1291 | C | N.G. |

A U-tube mercury manometer is used to measure propane gas pressure.

a. True

b. False

.....
348. | I3 | c | Delmar | 1291 | C | N.G. |

What type of air mixes with the gas as it enters the burner?

a. Outside

b. Secondary

c. Primary

d. Inside

.....
349. | I4 | a | Delmar | 1291 | C | N.G. |

Before systematic problem solving can be done on a refrigerant system, there must be proper airflow.

a. True

b. False

.....
350. | I4 | c | Delmar | 1291 | C | N.G. |

What is required to check refrigerant system pressures?

a. Hydronic gauge

b. Air pressure gauge

c. Gauge manifold set

d. U-tube manometer

.....
351. | I4 | d | Delmar | 1291 | C | N.G. |

What problem will an iced-over evaporator create for the compressor?

a. Broken crankshaft

b. High rpm

c. Motor burn-out

d. Liquid slugging

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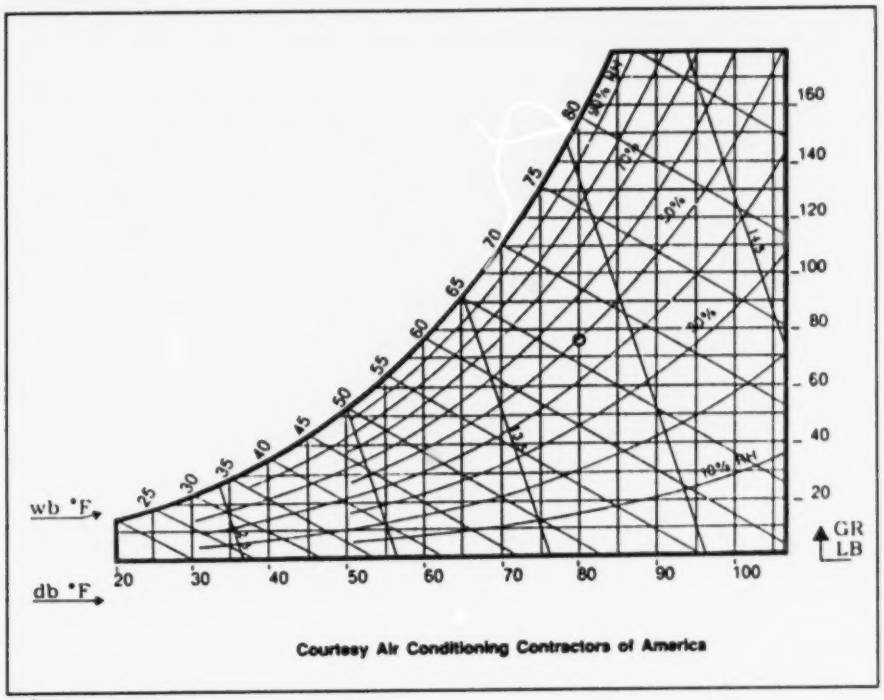

Figure J1

.....
352. | J1 | b | Modern | 1291 | C | R.N. | ART

The dry-bulb scale on a psychrometric chart (Figure J1) is located above the saturation curve.

a. True

b. False

.....
353. | J1 | a | Modern | 1291 | C | R.N. | ART

The saturation curve of a psychometric chart (Figure J1) is used to determine wet bulb and dew point temperature.

a. True

b. False

.....
354. | J1 | a | Modern | 1291 | C | R.N. |

How is actual moisture content contained in a sample of air measured?

a. Grains per pound of air

b. Gallons per pound of air

c. Percent saturation of air

d. Specific volume of air

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355. | J2 | c | Modern | 1291 | C | R.N. | ART

Using Figure J1, determine what window temperature must be maintained to prevent condensation if it is located within a room that is 75F and 30% relative humidity.

a. 24

b. 37

c. 41

d. 56

.....
356. | J2 | a | Modern | 1291 | C | R.N. | ART

Using Figure J1, determine the amount of heat contained in a sample of air that is 75F and 50% relative humidity.

a. 28.4

b. 56.5

c. 64

d. 75

.....
357. | J2 | a | Modern | 1291 | C | R.N. | ART

A room air conditioner was started when the temperature was 75F and the wet bulb temperature was 65F. After two hours, the temperature was reduced to 65F and 50% relative humidity. Using Figure J1, determine how much latent heat was removed.

a. 4.6 BTU

b. 7 BTU

c. 10 BTU

d. 20 BTU

.....
358. | J3 | d | Modern | 1291 | C | R.N. |

A sling psychrometer is used to determine which factor of air?

a. Air volume

b. Specific volume

c. Purity

d. Wet bulb temperature

.....
359. | J3 | c | Modern | 1291 | C | R.N. |

To calculate the volume of air flowing through the duct in cubic feet per minute, which two factors are needed?

a. Duct size and cross-sectional area

b. Air velocity and density

c. Air velocity and duct cross-sectional area

d. Air density and duct cross-sectional area

.....
360. | J3 | b | Modern | 1291 | C | R.N. |

What is an anemometer used to measure?

a. Wet bulb temperature

b. Air speed in feet per minute

c. Air volume in cubic feet per minute

d. Air volume in feet per minute

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.....
361. | J4 | b | Modern | 1291 | C | R.N. |

Ozone is a form of oxygen produced by the burning of R type refrigerants.

a. True

b. False

.....
362. | J4 | a | Modern | 1291 | C | R.N. |

The term "air conditioning" applies to a cooling and dehumidifying process.

a. True

b. False

.....
363. | J4 | c | Modern | 1291 | C | R.N. |

What results when ultraviolet light reacts with oxygen?

a. Explosion

b. Hydrogen

c. Ozone

d. Carbon dioxide

.....
364. | J5 | d | Modern | 1291 | C | R.N. |

Thermal resistance of materials is measured by what unit?

a. U-factor

b. BTU

c. Degrees

d. R-factor

.....
365. | J5 | b | Modern | 1291 | C | R.N. |

What are the two major sources of heat loss in a structure?

a. Conduction and latent heat

b. Conduction and leakage

c. Leakage and convection

d. Latent and sensible heat

.....
366. | J5 | b | Modern | 1291 | C | R.N. |

Heat gain through windows is a major factor in cooling load calculation. Approximately how much more heat do windows transfer than walls?

a. Twice as much

b. Three times as much

c. Four times as much

d. Five times as much

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367. | J5 | d | Modern | 1291 | C | R.N. |

Which structure would allow the LEAST amount of heat loss?

a. A window with an R-factor of 5

b. A door with an R-factor of 10

c. A ceiling with an R-factor of 11

d. A wall with an R-factor of 19

.....
368. | J5 | b | Modern | 1291 | C | R.N. |

The outside air film has a greater resistance to heat flow than the inside air film.

a. True

b. False

.....
369. | J6 | a | Modern | 1291 | C | R.N. |

A wet-bulb thermometer is simply a dry bulb with a wet sock placed over the bulb.

a. True

b. False

.....
370. | J6 | d | Modern | 1291 | C | R.N. |

What does a manometer measure?

a. Humidity

b. Enthalpy

c. Velocity

d. Pressure

.....
371. | J6 | a | Modern | 1291 | C | R.N. |

A "sling" psychrometer is so named because one actually slings it through the air to determine wet and dry bulb temperatures of the air.

a. True

b. False

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372. | K1 | a | Delmar | 1291 | C | N.G. |

A service report should show a record of repairs made and parts used.

a. True

b. False

.....
373. | K1 | c | Delmar | 1291 | C | N.G. |

What is included in the service report?

a. Manufacturer address

b. Manufacturer facility

c. Customer name

d. Customer income level

.....
374. | K1 | b | Delmar | 1291 | C | N.G. |

What is included in the service report?

a. Customer attitude

b. Customer address

c. Company sales record

d. Company product line

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375. | Leadership 1 | c | VICA | 0889 | C | Fred Smith |

Which is a poor reason for students to enroll in occupational training programs?

a. To work toward a career

b. To develop business and industry contacts

c. To avoid taking math, science, or English classes

d. To work toward financial independence

.....
376. | Leadership 1 | a | VICA | 0889 | C | Fred Smith |

Only one VICA club per school is allowed.

a. True

b. False

.....
377. | Leadership 1 | d | VICA | 0889 | C | Fred Smith |

How many VICA districts does Missouri have?

a. 3

b. 5

c. 7

d. 9

.....
378. | Leadership 1 | b | VICA | 0889 | C | Fred Smith |

In which national VICA region is Missouri located?

a. 3

b. 4

c. 5

d. 6

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379. | Leadership 2 | b | VICA | 0889 | C | Fred Smith |

Personal values rarely affect career choices.

a. True

b. False

.....
380. | Leadership 2 | a | VICA | 0889 | C | Fred Smith |

A career should align with one's personal values, interests, and abilities.

a. True

b. False

.....
381. | Leadership 3 | b | VICA | 0889 | C | Fred Smith |

Effective decision-making can be broken down into six steps.

a. True

b. False

.....
382. | Leadership 3 | b | VICA | 0889 | C | Fred Smith |

A new supervisor should be liked by all workers in order to be effective.

a. True

b. False

.....
383. | Leadership 3 | d | VICA | 0889 | C | Fred Smith |

Which goal should a supervisor work toward in order to succeed and improve worker moral?

a. Keep attention on getting work done

b. Be as fair as possible

c. Avoid taking a worker's negative feelings personally

d. All the above

.....
384. | Leadership 3 | a | VICA | 0889 | C | Fred Smith |

To be more productive, workers need ways to measure and use time more effectively.

a. True

b. False

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385. | Leadership 4 | d | VICA | 0889 | C | Fred Smith |

Which trait or traits do employers expect from their employees?

a. Cooperation and acceptance of evaluation

b. Honesty

c. Initiative

d. All of the above

.....
386. | Leadership 4 | d | VICA | 0889 | C | Fred Smith |

Which characteristic should employees expect from their employers?

a. Understanding of job requirements

b. Fair payment for labor

c. Equal treatment for all employees

d. All of the above

.....
387. | Leadership 4 | a | VICA | 0889 | C | Fred Smith |

Effective communication, care for people, flexibility, dependability, optimism, and perseverance are traits of good leaders.

a. True

b. False

.....
388. | Leadership 5 | a | VICA | 0889 | C | Fred Smith |

Good table manners include entering into table conversation.

a. True

b. False

.....
389. | Leadership 5 | b | VICA | 0889 | C | Fred Smith |

A coat room clerk at a restaurant is usually NOT tipped.

a. True

b. False

.....
390. | Leadership 5 | a | VICA | 0889 | C | Fred Smith |

Employees should stand when an authority figure (employer) joins them for a meal.

a. True

b. False

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391. | Leadership 6 | b | VICA | 0889 | C | Fred Smith |

It is a good idea to use big words when writing in order to impress people.

a. True

b. False

.....
392. | Leadership 6 | a | VICA | 0889 | C | Fred Smith |

Self-concept affects verbal communication.

a. True

b. False

.....
393. | Leadership 6 | a | VICA | 0889 | C | Fred Smith |

When speaking, always use a vocabulary that others can understand.

a. True

b. False

.....
394. | Leadership 7 | a | VICA | 0889 | C | Fred Smith |

Professionals respect themselves and others.

a. True

b. False

.....
395. | Leadership 7 | a | VICA | 0889 | C | Fred Smith |

A person's code of ethics defines his or her principles or standards of right and wrong.

a. True

b. False

.....
396. | Leadership 7 | a | VICA | 0889 | C | Fred Smith |

A professional code of ethics includes both legal and moral standards.

a. True

b. False

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397. | Leadership 8 | a | VICA | 0889 | C | Fred Smith |

Appropriate business attire for men would include a traditional dark suit.

a. True

b. False

.....
398. | Leadership 8 | a | VICA | 0889 | C | Fred Smith |

Fashion accessories reflect the self-image of an individual.

a. True

b. False

.....
399. | Leadership 8 | a | VICA | 0889 | C | Fred Smith |

Getting plenty of sleep and avoiding junk food can improve personal appearance.

a. True

b. False

.....
400. | Leadership 9 | a | VICA | 0889 | C | Fred Smith |

A resume is a well-organized overview of what one has to offer an employer.

a. True

b. False

.....
401. | Leadership 9 | a | VICA | 0889 | C | Fred Smith |

A letter of application should ask an employer for an interview.

a. True

b. False

.....
402. | Leadership 9 | a | VICA | 0889 | C | Fred Smith |

The local chamber of commerce can help people research employers.

a. True

b. False

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403. | Leadership 10 | a | VICA | 0889 | C | Fred Smith
|

When parliamentary procedures are used at a meeting, only one subject at a time should be discussed.

a. True

b. False

.....
404. | Leadership 10 | a | VICA | 0889 | C | Fred Smith |

Parliamentary procedure calls for the finishing of old business before new business is started.

a. True

b. False

.....
405. | Leadership 10 | a | VICA | 0889 | C | Fred Smith |

Parliamentary procedure calls for standing committee reports to be given before special committee reports.

a. True

b. False

.....
406. | Leadership 10 | a | VICA | 0889 | C | Fred Smith |

Proper use of the gavel signals members to stand or sit.

a. True

b. False